

BOCA Western Port Survey: long-term monitoring of waterbird numbers

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Abstract

Since 1973 volunteers from the Bird Observers Club of Australia (BOCA, formerly known as Bird Observers Club), have counted birds several times a year at their high-tide roosts within Western Port, a Ramsar designated site. The survey focuses on waterbirds and shorebirds in the tidally influenced areas. This paper presents data for some of the species that have declined, increased or remained constant in numbers during this period and mentions some factors responsible for these numbers. (*The Victorian Naturalist* 126 (3), 2009, 99–107)

Keywords: waterbirds; shorebirds; survey; Western Port; Bird Observers Club of Australia

Introduction

Western Port is a large shallow embayment east of Melbourne in south-east Australia. It is one of the three most important sites for shorebirds in Victoria (Watkins 1993) and is a Ramsar site. Most of the bay is shallow, has extensive mudflats at low tide and is fringed by mangroves (*Avicenna marina*) and saltmarsh. There is some industry and commercial shipping centred around Hastings in the west with a deep-water port and shipping channels maintained by dredging.

Western Port has three marine parks and is very popular for recreational boating and fishing. Phillip Island, at the southern edge of the Bay, is a major tourist attraction, particularly in summer. French Island in the centre of the Bay is twice as large as Phillip Island, but it is sparsely populated: the French Island National Park covers two-thirds of the island. Both islands have extensive freshwater and brackish wetlands.

Western Port provides valuable roosting and foraging habitats for shorebirds and waterbirds with rich areas of mangroves, saltmarsh and intertidal mudflats. Western Port has four wetlands types: permanent saline and semi-permanent saline around the Bay, deep freshwater marshes and permanent open freshwater areas on French and Phillip Islands.

The BOCA Western Port Survey, initiated by Richard Loyn in 1973, began with the aim of locating major high-tide roosts and counting birds whilst they were concentrated at those roosts. At low-tide, waterbirds are widely dispersed over vast areas of mudflats, making regular counts impractical. The survey continues

to focus on waterbirds and shorebirds in the tidally influenced areas of the Bay (Loyn 1978; Dann *et al.* 1994; Loyn *et al.* 1994; Loyn 2002; Loyn and Dennett 2008).

Since 1973, teams of BOCA volunteers and others, have gathered on a predetermined day at some 20 regular sites within the Bay, plus other conditional sites, prior to the daytime high tide. All waterbirds are counted and numbers recorded. Counts are made at least three times a year, in February when the Palaearctic shorebirds are preparing to migrate to their breeding grounds in the far Northern Hemisphere and when others use Western Port as a summer refuge; in June/July for resident and over-wintering migrants and in November/December when post breeding and juvenile Palaearctic shorebirds have returned to moult and spend the Austral summer.

As a consequence of this continuous, long-running survey the significance of Western Port for birds has become widely recognised. It is listed under the Ramsar Convention on Wetlands and is part of the Shorebird Site Network for the East Asian-Australasian Flyway. In 2002, it was included as part of the Biosphere Reserve for Western Port and Mornington Peninsula, has been recognized by WWF for Nature Australia Shorebird Conservation Project and is a key monitoring site for Palaearctic and Australasian shorebirds.

The wetland avifauna of Western Port can be broadly categorised as:

- waterbirds, including the fishers (cormorants, pelican and terns), waterfowl (ducks, grebes, swan, etc.), crakes and rails, gulls and large

wading birds (herons, ibis, spoonbills and egrets);

- international migratory shorebirds, comprising Palaearctic species breeding in Asia and the Arctic and one Australasian species, Double-banded Plover, breeding in mountains of the South Island of New Zealand;
- Australian breeding shorebirds, including dotterels, plovers, avocet, stilts, oystercatchers and lapwings; and
- bushbirds, associated with wetlands, such as songbirds, raptors, kingfishers and parrots.

To satisfy the Ramsar Convention criteria for identifying areas of international importance for shorebirds in Australia, an area must support one per cent or more of the world population of a particular species or subspecies of shorebirds, or support 20 000 or more individuals of that species or subspecies. As a result of the BOCA survey and some additional studies Western Port was recognised as having internationally significant numbers of Eastern Curlew, Common Greenshank, Curlew Sandpiper, Red-necked Stint and Double-banded Plover and a significant national population of Pacific Golden Plover (Watkins 1993).

The smallest and most numerous Palaearctic waders in Western Port and Australia are Red-necked Stints and Curlew Sandpipers. Observations of these small waders, banded by Victorian Wader Study Group, show their migration routes from Western Port to Siberian breeding grounds occur in four or five stages, with 'refueling' stopovers in north-west Australia (Broome), south-east Asia, further north in eastern China and perhaps inland Siberia. Larger waders, Bar-tailed Godwits and Red Knot make fewer stopovers (Minton *et al.* 2006).

Overseas factors such as loss of feeding sites due to land reclamation (as at Saemangeum in Korea), reduction in water flows due to dam formations, and weather events causing early or late thaws/melts, may all impact on the environment of migrating birds.

What other factors may be occurring? One local event in the early 1980s, occurring throughout Western Port for unknown reasons, was a marked decline in sea grass (*Zostera* spp). Sea grass is essential as a primary food source for some species, such as the herbivorous Black Swan, and provides essential protective nurs-

ery cover for fingerlings and other aquatic species. Hence 'fishers' such as Pied and Little Pied Cormorant and Australian Pelican all showed similar significant decreases following this very serious local event.

Throughout Western Port the sea beds are variable, with significant regional differences of sand, silt and mud substrates and water flows. Various species take advantage of these different niches. Long term monitoring over three seasons each year has shown interesting trends in shorebird numbers. Some examples follow.

Seasonal and cyclic changes

All species show some seasonal changes on an annual basis. The most marked are obviously the migrating shorebirds, but most other species also show consistent seasonal variation due to climatic and breeding requirements. For example, Black Swans are present throughout the year, but their numbers fluctuate and show a seasonal cycle. Their counts are lowest during winter and early spring (Figs. 1 and 2) when they are breeding locally on adjacent farmlands and swamps. Most locally breeding waterbirds show a seasonal pattern with minimal numbers in the winter-spring breeding season and maximum numbers in summer or autumn. Exceptions include the Great and Little Black Cormorants, which tend to be recorded most in spring.

Many of the international waders breed in Siberian regions where lemmings and voles also breed. These small rodents show cyclical 'boom and bust' breeding events. When their numbers are high, predators such as owls and foxes, have plenty of food for their young, but when the lemming numbers crash they seek other food sources, including eggs and chicks of waders. Consequently there is a reduction in juvenile waders migrating southwards. These events tend to have a periodicity of about three years. These trends and others (Loyn and Dennett 2008, Fig. 3) can be seen in some of the Western Port data, for small waders such as Curlew Sandpipers and Red-necked Stints.

Early decreases

Grey-tailed Tattler

This Palaearctic wader is most commonly found overwintering in northern Australia, with Victoria and Tasmania at the end of its range. Since the survey began there has been a dramatic decrease in their numbers. In the 1970s, 60-81



Fig.1. Black Swans breed in local fresh water swamps and dams. Photo by Xenia Dennett.

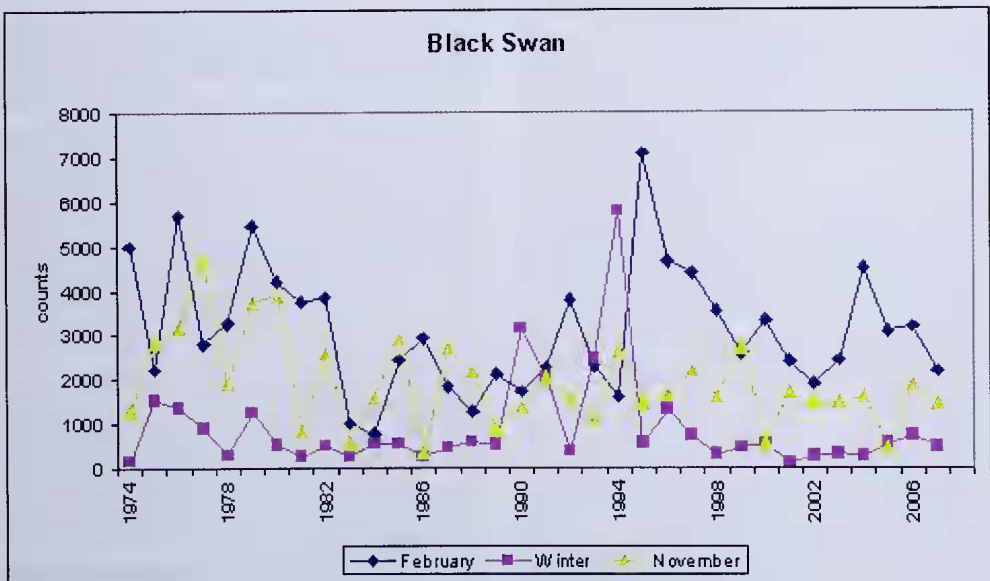


Fig. 2. Black Swan counts from BOCA Western Port Survey from 1974 to 2007 showing seasonal variations with maximum numbers in February, the summer refuge season.

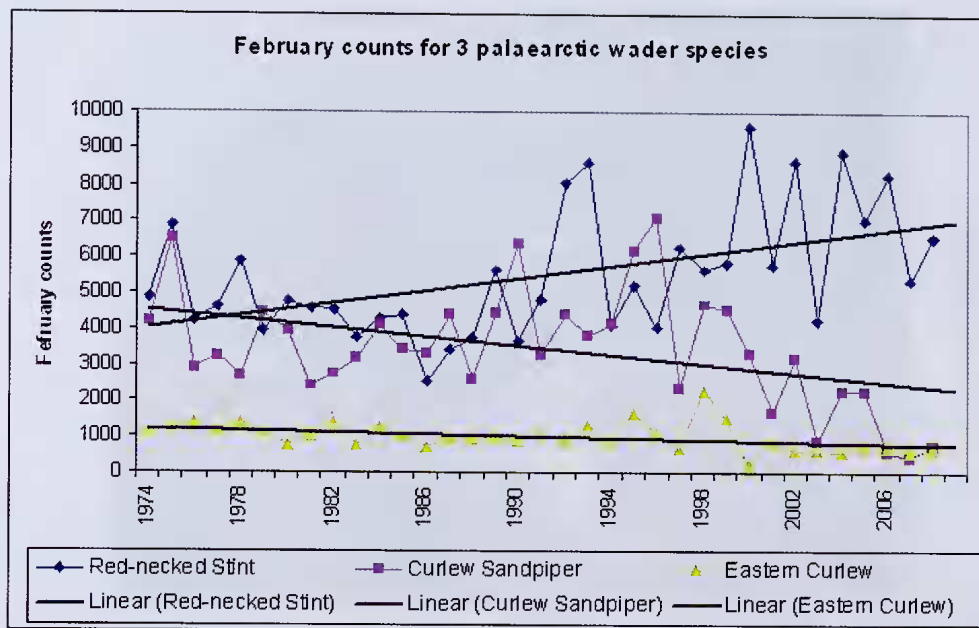


Fig.3. Total February counts for three species of palaeartic waders during the BOCA Western Port Survey period 1974 –2007. Trendlines have been added to show an apparent increase in Red-necked Stint, a significant decrease of the slightly larger Curlew Sandpiper, and a slow steady decline in the numbers of the largest wader Eastern Curlew.

individuals were counted regularly in Western Port on their return from the Arctic. In the 1980s numbers dropped to around 10, by 1990s only two and in the last decade there have been very few records. However, there has also been a similar decrease throughout northern Australia (Kearney *et al.* 2008) and the East-Asian Australasian Flyway, so local events in Western Port are unlikely to be a major factor in the local decline. These birds often roost in mangroves (making counting difficult) as well as intermittently moving their roosting sites (Minton 2000). It is therefore possible that they, and other birds, may sometimes be overlooked.

Silver Gulls

These scavenging omnivores are present throughout the year, with highest numbers in November and February. In the 1970s their numbers were increasing, until the open rubbish tip at Hastings was closed. A significant decrease followed, and as other regional tips were also closed their numbers have declined (Fig. 4). Active management measures have also delayed their recovery.

Black Swans feed directly on the sea grass growing in shallow waters, and the sudden loss of sea grass, in the early 1980s, severely affected numbers. Since then, there has been some increase in sea grass and local numbers of Black Swan are again increasing around Rhyll and Observation Point. But some beds in Western Port still show no signs of recovery, for example around the north-east section adjacent to Yallock Creek (BOCA 2003), where water turbidity in this area is very high. Is this reducing the amount of sunlight essential for photosynthesis and plant growth?

Australian Pelican numbers in February also dropped from an average of 200 prior to the sea grass loss in 1983, to about 50 a decade later, and are still continuing to struggle upwards (Fig. 5). These 'fishers' breed in inland Australia in saline waterways, and there have been significant breeding events since then at several major inland water bodies. Could these breeding events have 'depleted' the coastal numbers?

Numbers of Little Pied Cormorant, another fisher affected by the sea grass crash, showed similar declines and have not recovered (Figs.

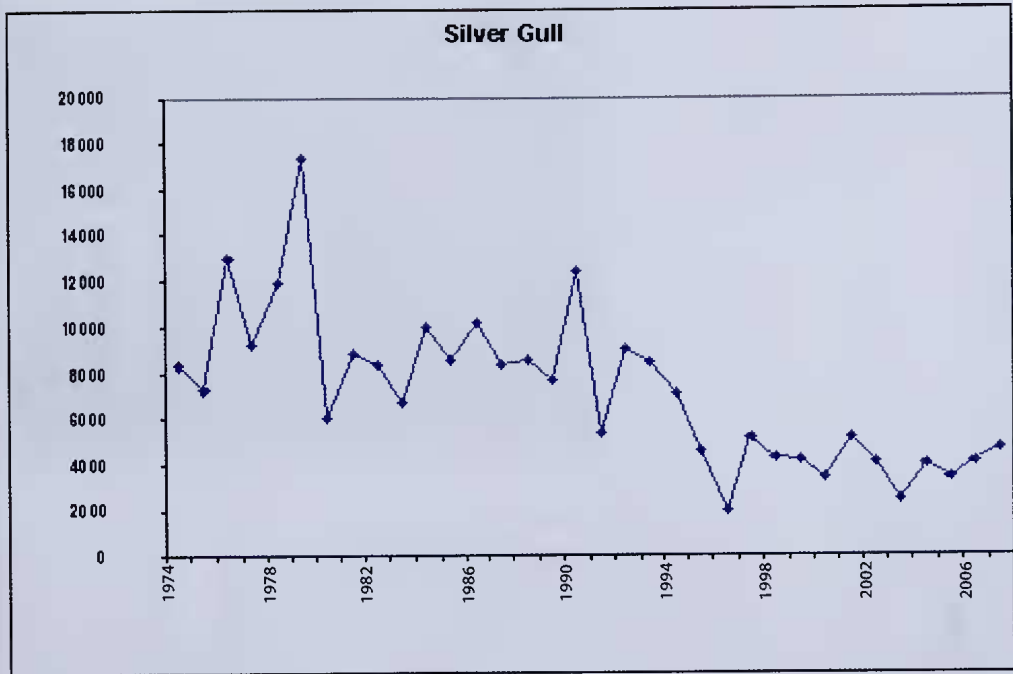


Fig. 4. Silver Gull combined counts for February, winter and November, show increasing numbers until local open tip at Hastings was closed in late 1970s, followed by further regional closures in 1994.

6 and 7). The larger Pied Cormorant declined initially, but showed a later recovery. These birds are able to fish in deeper waters outside Western Port.

Recent decreases

At least two species of international migratory wader have decreased in recent years, as indicated below. These declines are usually considered to be related to events on the breeding grounds or events such as loss of habitat on their east Asian migration routes.

Curlew Sandpiper

Of all the migrating wader species these small waders (Fig. 8) have shown the largest decline throughout the East Asian-Australasian Flyway. In recent years a lack of juvenile birds in recapture studies is indicative of a significant decline in breeding success, in addition to the normal cyclical pattern (Fig. 3). The reasons for this are not known.

Eastern Curlew

Since the 1980s all counts in south-east Australia have shown a continuing decline (Gosbell and Clemens, 2006). Numbers in Western Port

seemed to hold up well until the early 1990s (Dann *et al.* 1994), but have declined subsequently (Fig. 3). Probably a variety of factors are responsible, including events en route and on the breeding grounds.

General increases

Red-necked Stint

Observations on this, the smallest migrating wader, do not show the obvious downward trend shown by most other Palaearctic waders, and there even appears to be an increase (Fig. 3) in numbers. This is in striking contrast to the slightly larger, but still very small, Curlew Sandpiper mentioned above. Both have a rather similar northern migration route, although Curlew Sandpipers tend to take a more western route on their southward migration (Minton *et al.* 2006). Why are these trends occurring?

Bar-tailed Godwit

Although most data from the east coast show a long-term decline in numbers, Western Port figures are more encouraging with a general upward trend to approximately double the numbers found in early years (Fig. 9). Why is this?

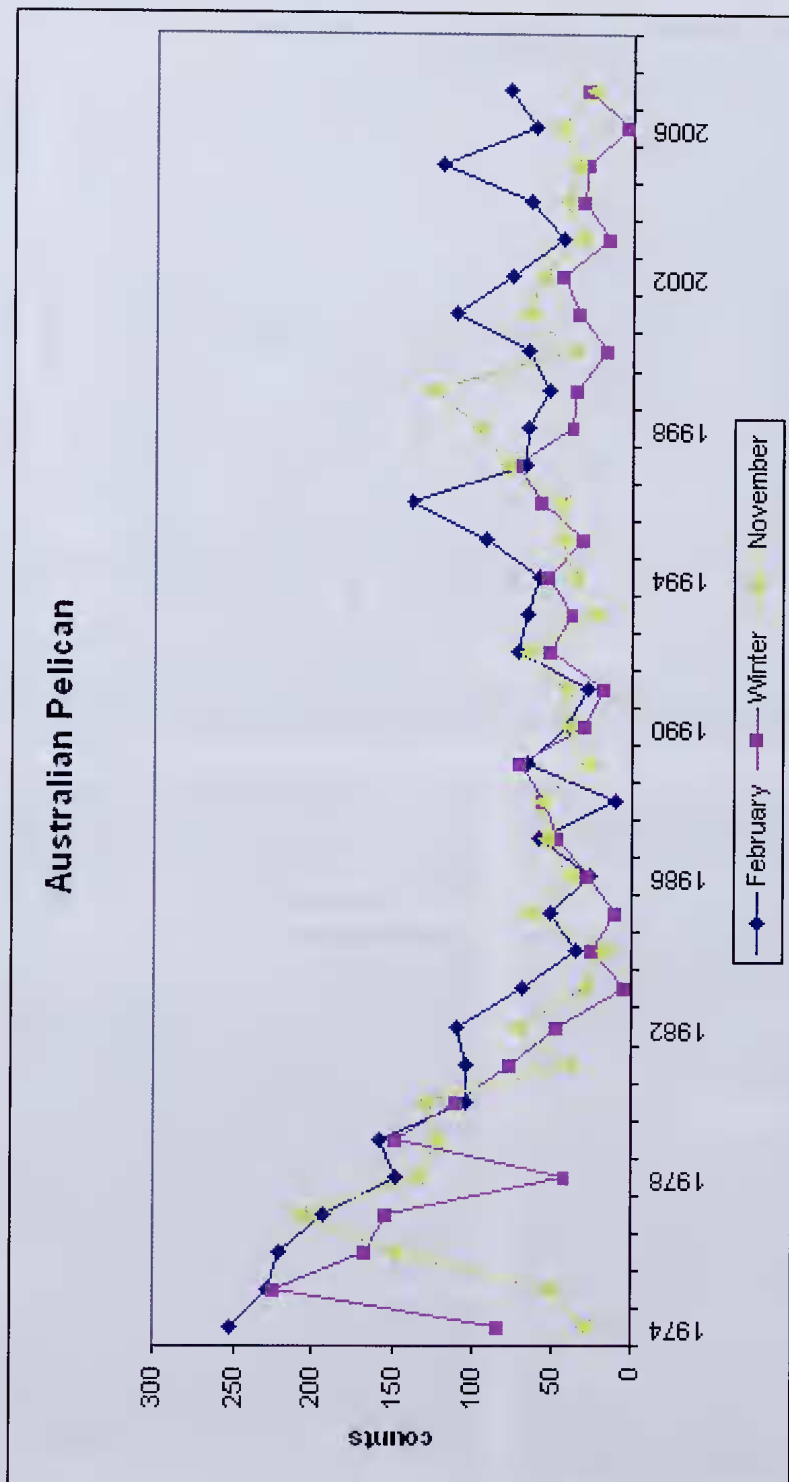


Fig. 5. Australian Pelican showing seasonal variations. Numbers were declining prior to the sea grass collapse in early 1980s and still have not recovered.



Fig. 6. Little Pied Cormorant feeds on fish and is heavily dependent on food stocks in shallow regions. Photograph from BOCA collection.

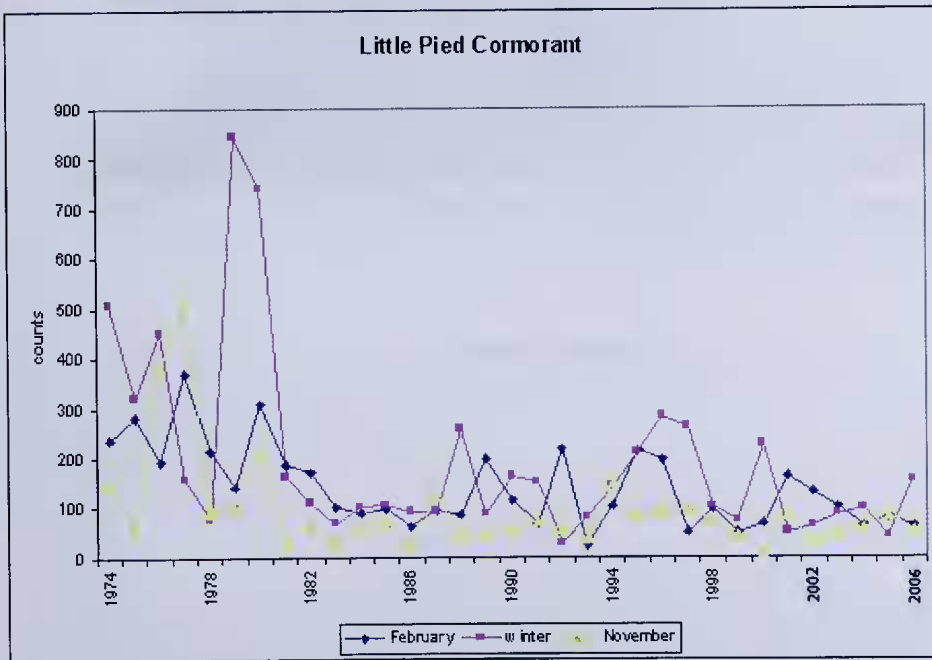


Fig. 7. Little Pied Cormorant counts show some seasonal variation each year, but numbers decreased after sea grass losses in 1980s, with little recovery.

Recent arrivals

Red-necked Avocets have made a dramatic appearance in Western Port counts in recent years. These are Australian endemic, breeding waders, with a characteristic upturned bill used to sieve their aquatic food of small crustaceans, worms and molluscs. They rarely oc-

curred in the bay until June 1991, when seven Red-necked Avocets were counted in the Pioneer Bay area. No further birds were recorded until July 1994 when 760 birds were counted in the same area, and at the September count they numbered 850 before falling to 370 in November 1994. No birds were present in the following



Fig.8. Some Curlew Sandpipers migrate from Siberian breeding grounds to spend the austral summer in Western Port where they moult their worn plumage and 'fatten-up' before returning to breed in the following year. Photo by Xenia Dennett.

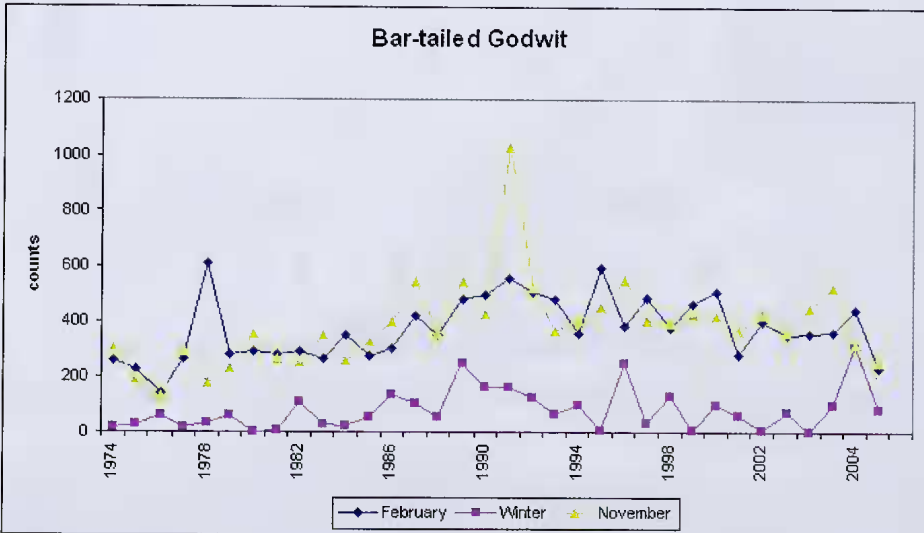


Fig. 9. Bar-tailed Godwit is one of the few species of palaeartic wader to show an increase in numbers in Western Port.

February. Since then this pattern of birds occurring in Pioneer Bay from winter through to November has become established, except in 2000 and 2007 when no avocets were counted. Because dates for the counts vary somewhat, depending on suitable tides and days, we may miss early or later arrivals as was possibly the case in June 2000 (count done 17 June). We can speculate on other possible reasons, but favourable food sources at appropriate water levels and a protected habitat are probably very important.

Other data from long-term avifauna studies have recently been published (Olsen 2008), much of which, as is the case with our data, has been obtained by dedicated volunteers. The BOCA Western Port Survey has already provided much useful information, particularly relating to seasonal and longitudinal trends. Some factors are known to be operating at the local, regional, national and international levels whilst others are unknown. But without these data one cannot begin to ask questions, plan, and attempt to manage this very complex, fragile and fascinating environment for all who use it. People, pollution and pests probably pose the greatest risks to the biodiversity of Western Port and its future, including those so very dependent upon it for food and shelter—the avifauna.

Acknowledgements

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One Hundred Years Ago

BIRD DAY.—The first Bird Day instituted by the Education Department for the benefit of the scholars attending the State schools of Victoria was celebrated on Friday, 29th October. A special programme of lessons, dealing with various aspects of bird life and laying particular stress on their protection and preservation, was carried out. In the smaller schools, where possible, excursions were made to localities frequented by birds, and lessons given in the field. In the metropolis, as this was impossible, the services of a number of natural history enthusiasts were secured, and practical demonstrations on the value of birds were given by members of the Field Naturalists' Club, the Ornithologists' Union, and the Bird Observers' Club, to the senior classes of the suburban schools. On the whole, the movement was a success, and it is hoped will lead to more interest in our feathered friends, without whose aid human life would almost become impossible. Advantage was taken of the day to inaugurate the Gould League of Bird-Lovers, and some 50,000 children handed in their names as willing to observe its precepts. We trust this movement will, as the years roll by, greatly lessen the destructive pot-hunting which takes place on every holiday.

From *The Victorian Naturalist* XXVI, p. 95, November 1909